

C L A I M S

1. Coil for circulation of a coolant fluid, said coil comprising at least one segment of tube wound along a helical generatrix, characterized in that said coil comprises at least a second segment of tube (512, 513) wound along a helical generatrix and extending in parallel to the first segment (511) between a distributor (53) and a manifold (54), said first and second segments being centred on the same geometrical axis (X_5), with substantially the same bending radius (R_1) and nested so that they together form a substantially cylindrical bundle (51).
- 10 2. Coil according to Claim 1, characterized in that it comprises a second bundle (52) formed by at least one segment of tube (521, 522) wound along a helical generatrix, extending between said distributor (53) and said manifold (54) and centred on said axis (X_5), said second bundle being of substantially cylindrical shape, with a radius (R_2) smaller than the radius (R_1) of the first bundle (51).
- 15 3. Coil according to Claim 2, characterized in that said second bundle (52) is formed by at least two segments of tubes (521, 522) wound along helical generatrices, nested and extending in parallel between said distributor (53) and said manifold (54).
- 20 4. Coil according to one of the preceding Claims, characterized in that said first bundle (51) is formed by three segments of tube (511, 512, 513) wound along helical generatrices and nested.
5. Coil according to one of the preceding Claims, characterized in that said segments (511,

512, 513, 521, 522) have substantially the same length and/or induce substantially the same pressure drop on the flow of said coolant fluid, between said distributor (53) and said manifold (54).

6. Coil according to one of the preceding Claims, characterized in that it

5 comprises a tube (56) extending, in a direction substantially parallel to said axis (X_5), between said first (51) and second (52) bundles, said tube being connected either to said distributor (53) or to said manifold (54).

7. Coil according to one of the preceding Claims, characterized in that said distributor (53) and/or said manifold (54) are in the form of a torus and centred

10 on said axis (X_5).

8. Coil according to Claim 7, characterized in that said distributor (53)

and/or said manifold (54) are curved with a radius (R_3, R_4) substantially equal to the radius (R_2) of said first bundle (51) or possibly of said second bundle (52), with the result that they are substantially in line with said first bundle or

15 possibly with said second bundle.

9. Method for manufacturing a coil for circulation of a coolant fluid, said

coil comprising at least one segment of tube wound along a helical generatrix, characterized in that it comprises a step consisting in interleaving (F_1, F_2) said

segment (511) with at least a second segment of tube (512, 513) wound along a 20 helical generatrix with substantially the same bending radius (R_1) as the first segment, so as to form a substantially cylindrical bundle (51).

10. Method according to Claim 9, characterized in that said segments are

interleaved by a movement of

screwing (F_1, F_2) around a geometrical axis (X_5) common to said segments.

11. Reactor for the treatment of a viscous medium or for carrying out chemical reactions in a viscous medium, said reactor comprising a vessel, characterized

5 in that it comprises a coil (5) according to one of Claims 1 to 8 or manufactureed according to one of Claims 9 or 10.

12. Reactor according to Claim 11, characterized in that it comprises an agitator (4) arranged around or inside said coil (5).

13. Reactor according to Claim 12, characterized in that said agitator is
10 suspended from the ceiling of said reactor (1) and forms a cage surrounding said coil (5), the supply and evacuation (56, 59, 61, 62) of the coolant fluid towards or from said coil being effected through the bottom (21) of said reactor.

14. Reactor according to Claim 12, characterized in that said agitator is formed by an endless screw centred on the geometrical axis (X_5) of an inner
15 bundle (52) or of the single bundle (51) of said coil (5).

15. Reactor according to one of Claims 11 to 14, characterized in that the inner bundle (52) or the single bundle (51) of said coil forms a central well (P) of radius (R_2) included between 20 and 70% of the radius (R) of said vessel (2), preferably included between 20 and 40% of said radius in the case of an inner
20 bundle.

16. Use of a reactor (1) of volume (V) greater than about 8 m^3 according to one of Claims 11 to 15 for the treatment of a viscous medium.

17. Use according to Claim 16 for carrying out a reaction of polymerization in a viscous medium.

18. Use according to Claim 16 or 17 for carrying out a discontinuous reaction of polymerization in a viscous medium.
19. Use according to Claim 16 or 17 for carrying out a continuous reaction of polymerization in a viscous medium.